



INSTRUCTIONS

-J02087

REV. 7-10-02

Kit Numbers 29914-01

SCREAMIN' EAGLE TWIN CAM 88B BIG BORE (1550) CONVERSION AND (EFI) STAGE 2 KIT

General

This kit is designed for installation on all 2001 and later Harley-Davidson Softail Twin Cam 88 Model Motorcycles.

See Service Parts illustration for kit contents.

Additional Parts Required

Installation of the camshafts included in this kit requires the separate purchase of the following kit from your Harley-Davidson Dealer:

Spacer Kit (P/N 25938-00)

NOTE

A Service Manual for your motorcycle is available at your Harley-Davidson Dealership.

CAUTION

Installation of this kit requires the ECM to be recalibrated. Failure to do so may result in severe engine damage. See your Harley-Davidson dealer for recalibration.

CAUTION

This engine related performance part is intended for High Performance and Racing applications and is not legal for sale or use on pollution controlled motor vehicles. This kit may reduce or void the limited vehicle warranty. Engine related performance parts are intended FOR THE EXPERIENCED RIDER ONLY.

CAUTION

A SERVICE MANUAL IS NEEDED TO INSTALL THIS KIT. The rider's safety depends upon the correct installation of this kit. If the procedure is not within your capabilities or you do not have the correct tools, have your Harley-Davidson dealer perform the installation. Improper installation of this kit could result in death or serious injury.

WARNING

To protect against shock and accidental start-up of vehicle, disconnect the battery cables, negative cable first, before proceeding. Inadequate safety precautions could result in death or serious injury.

WARNING

Always disconnect the negative battery cable first. If the positive battery cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion which could result in death or serious injury.

WARNING

Gasoline is extremely flammable and highly explosive under certain conditions. Do not smoke or allow open flame or sparks anywhere in the area when draining or servicing the fuel system. Drain gasoline into approved gasoline container only. Inadequate safety precautions could result in death or serious injury.

Installation

Installation of this kit is divided into 5 steps:

1. Big Bore Cylinder and Piston Conversion
2. High Performance Clutch Diaphragm Spring
3. High Performance Camshafts
4. Calibrate the ECM
5. High Performance Air Cleaner

CAUTION

Gaskets provided in the 1550 conversion kit eliminate the need for original headgasket O-rings. For this reason, DO NOT install the O.E. (original) O-rings (Part No.11273) to top of cylinder dowels or severe engine damage may occur.

1) BIG BORE CYLINDER AND PISTON CONVERSION

1. **Disassembly** - Refer to the ENGINE section of the appropriate Service Manual to remove cylinder heads, cylinders and pistons.
2. **Assembly** - Refer to the ENGINE section of the appropriate Service Manual for installing pistons, cylinders and cylinder heads.

2) HIGH PERFORMANCE CLUTCH DIAPHRAGM SPRING

1. **Disassembly** - Refer to the DRIVE section of the appropriate Service Manual to remove primary chaincase, chain, diaphragm spring retainer and diaphragm spring.
2. **Assembly** - Refer to the DRIVE section of the appropriate Service Manual for installing diaphragm spring retainer, diaphragm spring, chain and primary chaincase.

3) HIGH PERFORMANCE CAMSHAFTS

Installation of this kit requires removal and re-installation of the Cam Support Plate. Refer to Section 3, ENGINE, BOTTOM END Cam Support Plate, Removal and Disassembly/Assembly (Camshaft, Camshaft Bearings) of the applicable Service Manual for instructions.

1. Remove crank and primary cam sprocket flange bolts and washers according to applicable Service Manual. Discard cam drive sprocket flange bolts and washers.
2. Remove existing cam drive sprocket according to instructions in applicable Service Manual. If sprocket is non-splined, discard sprocket.
3. Remove cam bearings according to ENGINE, BOTTOM END Cam Support Plate, Disassembly/Assembly (Camshaft, Camshaft Bearings) instructions in applicable Service Manual. Discard cam bearings.

Install New Cam Bearings

1. See Figure 1. Install **new** Rear Cam Roller Bearing (P/N 8983) according to the following:

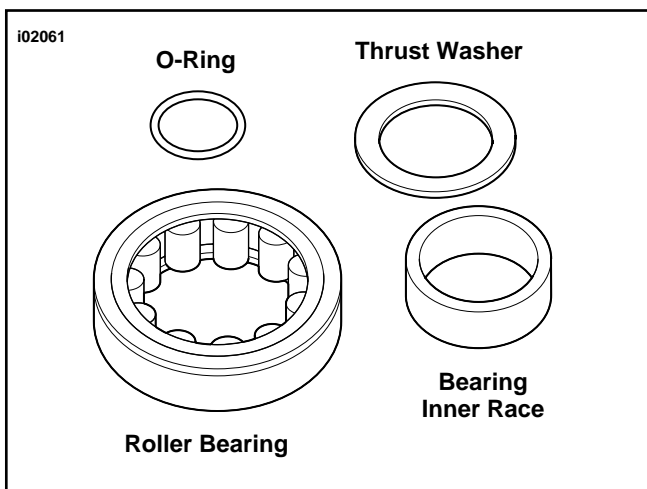


Figure 1. Rear Cam Roller Bearing Kit (P/N 8983)

2. Install O-ring, thrust washer, and bearing inner race onto rear camshaft as follows:
 - a. To properly locate thrust washer, first install O-ring in grinding relief groove. Groove is on the splined end between the machined area and the secondary cam sprocket. Exercise caution to avoid stretching or breaking the O-ring. Since the O-ring is not sold separately, damage will require purchase of new roller bearing kit.

CAUTION

The thrust washer will be offset to one side if the O-ring is not installed in the grinding relief groove. Damage to the bearing cage can occur if the thrust washer is not properly centered.

- b. Slide thrust washer down rear camshaft until centered over O-ring in grinding relief position.
- c. Slide bearing inner race down rear camshaft until contact is made with shoulder of machined area.
- d. Install primary cam sprocket spacer and sprocket on camshaft and secure using **thicker** flat washer and **long** flange bolt.

NOTE

If not enough of the splined shaft is exposed to install the sprocket, leave out the spacer and proceed to Step 2(e). Once the bearing inner race has been started onto the machined area, remove the flange bolt, washer and sprocket, then re-assemble using the spacer. Repeat Step 2(e) to fully install bearing inner race.

- e. See Figure 2. Wrap a shop rag around camshaft to get a firm grip and also to protect hand from sharp edges of sprocket. Using a 9/16 inch box wrench, turn flange bolt in a clockwise direction. Bearing inner race is fully installed when it makes firm contact with the thrust washer.

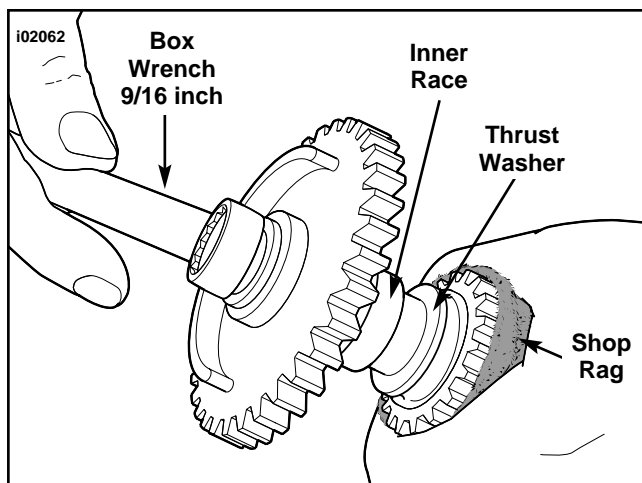


Figure 2. Install Bearing Inner Race (with O-Ring and Washer)

- f. Verify that thrust washer is locked in place and **cannot be rotated**. If necessary, install shaft in vise using brass jaw inserts, and further tighten flange bolt until the desired result is achieved.
 - g. Remove flange bolt, flat washer, sprocket and spacer.
3. Install **new** cam bearings into cam support plate according to the following:

NOTE

Be aware that the front and rear cam bearings are not interchangeable. The rear cam utilizes a roller bearing while the front cam utilizes a ball bearing. See Figure 3.

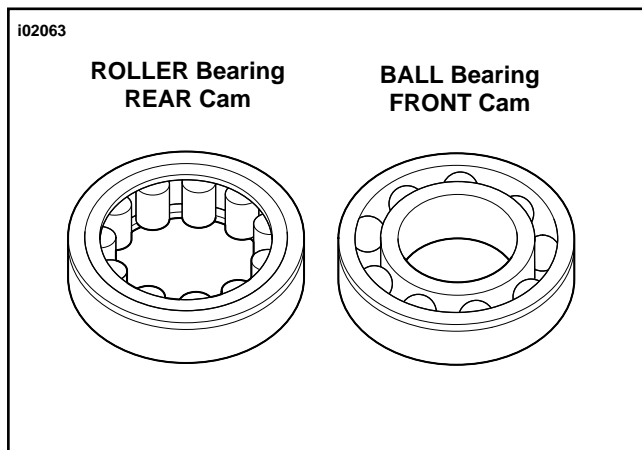


Figure 3. Cam Bearings

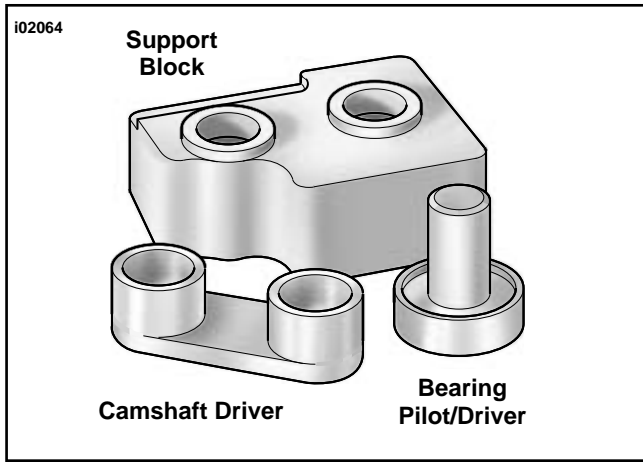


Figure 4. Camshaft/Camshaft Bearing Remover/Installer (P/N HD-43644)

a. See Figure 4. Obtain the CAMSHAFT/CAMSHAFT BEARING REMOVER/INSTALLER (HD-43644)

NOTE

Bearing fit may be a light press or slightly loose fit. If deemed necessary, clean bearing OD and apply Loctite Low Strength Threadlocker 242 (Blue) before installation. but exercise caution to avoid getting compound on rollers or bearing ID.

b. With the secondary cam chain side facing upward, place cam support plate on support block, so that outer races of bearings are properly supported. Note that one corner of the support block is contoured to accommodate the chain guide blocks cast into the front of the support plate.

c. Center new bearing over bearing bore with the lettered side up. Slide pilot shaft of bearing driver through bearing into hole of support block.

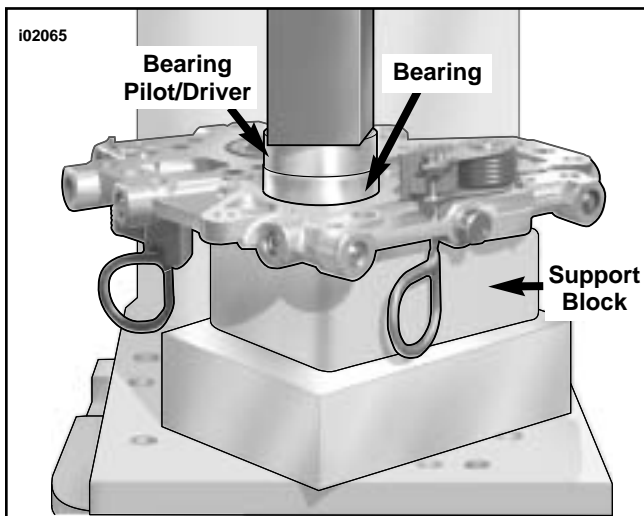


Figure 5. Press Bearings into Cam Support Plate

d. See Figure 5. Center bearing driver under ram of arbor press. Press on driver until bearing makes firm contact with counterbore in cam support plate. Repeat Steps a through c to install second bearing.

4. Apply a small dab of Loctite Medium Strength Threadlocker 243 (blue) to threads of four bearing retainer plate screws. Using a T20 TORX drive head, secure bearing retainer plate to cam support plate. Tighten screws to 20-30 in-lbs (2.3-3.4 Nm) in a crosswise pattern. Verify that hole in retainer plate is properly aligned with secondary cam chain oiler.
5. Start camshafts into cam bearings.
6. Place cam support plate back on support block, if removed. The block properly supports inner races of bearings as camshafts are installed.
7. Align punch marks on teeth of secondary cam sprockets (outboard faces). See Figure 6. Using a colored marker, carefully mark the punch mark locations on the inboard side of the sprocket teeth. These marks are needed to observe proper orientation of the camshafts when they are pressed into the bearings.

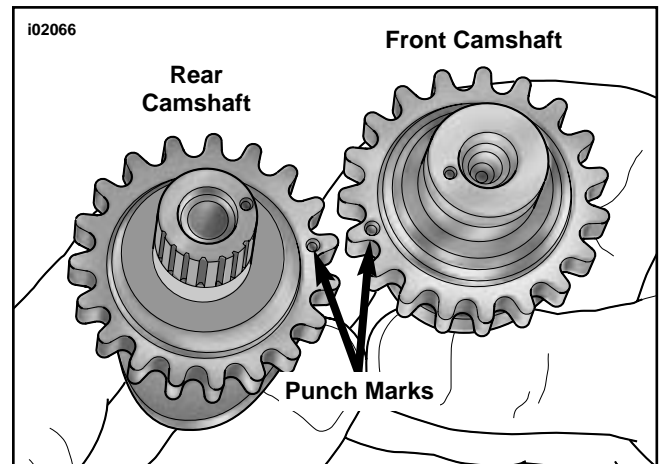


Figure 6. Align Punch Marks on Teeth of Camshaft Sprockets.

8. Place the secondary cam chain around the sprockets of both the front and rear camshafts. To maintain the original direction of rotation, be sure that the colored mark placed on the chain link during disassembly is facing opposite the cam support plate during installation.
9. Orient the camshafts so that they are positioned on opposite ends of the chain, and then verify that the colored marks placed on the inboard side of the sprocket teeth are still in alignment.
10. Maintaining the position of the camshafts on the chain with the colored marks in alignment, place the sprocket ends of the camshafts into the bearings.

NOTE

Be sure not to mix camshafts during the press procedure. The rear camshaft, which can be identified by the splined shaft, must go into the roller bearing at the rear of the cam support plate.

11. Place cup of camshaft driver over end of front camshaft only.

CAUTION

Be sure that tensioner shoe is clear of the secondary cam chain during the press procedure. Contact can result in damage that requires replacement of the tensioner assembly.

12. Center end of front camshaft under ram and **slowly** apply pressure to driver just to **start** front camshaft into bearing ID.

CAUTION

If rear camshaft is not properly aligned, edge of installed inner race can catch on bearing rollers. Bearing damage can result if contact occurs during the press procedure.

13. Slowly apply pressure to driver on front camshaft, while wiggling rear camshaft as necessary to guide inner race between bearing rollers.
14. When inner race on rear cam is started into roller bearing, apply pressure to driver until front camshaft is fully seated. If necessary, keep finger pressure at top of rear camshaft to ensure that assembly remains square and inner race moves to installed position in roller bearing.
15. After installing new cams, check for proper cam to cam timing using straightedge along punch marks as described in Service Manual.
16. Install **new** retaining ring in groove at end of front camshaft.

NOTE

Replace original oil pump to cam plate O-ring with new O-ring (P/N 11286).

NOTE

Replace original cam plate to crankcase O-ring with new O-ring (P/N 11301).

17. Install cam plate according to ENGINE, BOTTOM END Cam Support Plate, Disassembly/Assembly instructions in applicable Service Manual.
18. Apply a thin film of clean H-D 20W50 engine oil to the splines of the rear cam.
19. Install splined sprocket (P/N 25716-99) onto rear camshaft according to ENGINE, BOTTOM END Cam Support Plate, Disassembly/Assembly (Camshaft, Camshaft Bearings) instructions in applicable Service Manual. Use new spacers provided in kit P/N 25938-00 in place of those listed in Service Manual.

NOTE

Verify alignment at crank and primary cam sprocket punch marks as described in Service Manual.

NOTE

Verify alignment at crank and primary cam sprocket faces. Use spacers provided in kit (P/N 25938-00) to maintain alignment at + or - 0.10"

20. Use **new** cam drive sprocket flange bolt (P/N 996), **new** washer (P/N 6294), **new** crank flange bolt (P/N 898A) and **new** flat washer (P/N 6278A).
21. Install **new** flange bolts and washers as follows:
 - a. Ensure threads are clean and free from oil then apply Loctite Primer 7649.
 - b. Apply Loctite High Strength Threadlocker 262 (red), to threads of flange bolts.

WARNING

Failure to use Loctite 262 (Red) may result in a joint that will not maintain proper clamp load and may loosen under certain circumstances causing engine failure which could result in death or serious injury.

- c. Apply a thin film of clean H-D 20W50 engine oil to both sides of flat washers.
- d. Start flange bolt with flat washer to secure crank sprocket to end of crankshaft.
- e. Start flange bolt with flat washer to secure primary cam sprocket to end of camshaft.
- f. See Figure 7. Position CRANKSHAFT/CAMSHAFT SPROCKET LOCKING TOOL (HD-42314) between the crank and primary cam sprockets to prevent rotation. The handle of the tool is stamped "Crank" and "Cam" to ensure proper orientation.

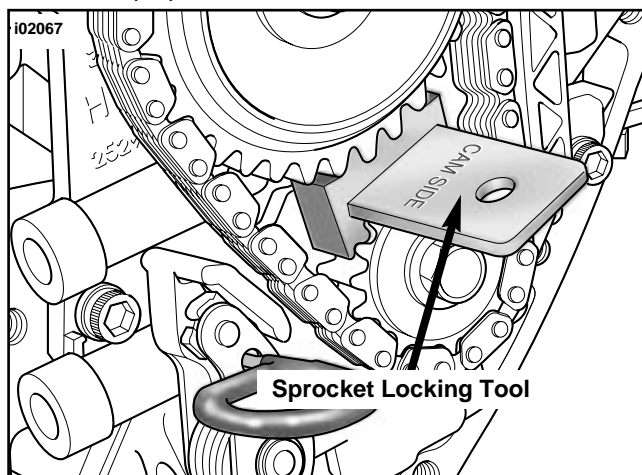


Figure 7. Crankshaft/Camshaft Sprocket Locking Tool (Part No. HD-42314)

- g. Tighten crank and primary cam sprocket flange bolts to 15 ft-lbs (20.3 Nm).
- h. Loosen each flange bolt one full turn.
- i. Tighten the **crank** flange bolt to 24 ft-lbs (32.5 Nm) final torque value.
- j. Tighten the primary **cam** sprocket flange bolt to 34 ft-lbs (46.0 Nm) final torque value.
- k. Remove the sprocket locking tool and follow instructions in Service Manual for unloading the primary cam chain tensioner.
22. Install the cam cover according to ENGINE, BOTTOM END, Cam Support Plate, Disassembly/Assembly instructions in the applicable Service Manual.

NOTE

Replace original cam cover gasket with new cam cover gasket (P/N 25244-99).

4) CALIBRATE THE ECM

Have dealer recalibrate the ECM prior to starting vehicle.

5) HIGH PERFORMANCE AIR CLEANER

Follow the instructions included with the High Performance Air Cleaner in this kit for installation.



Service Parts

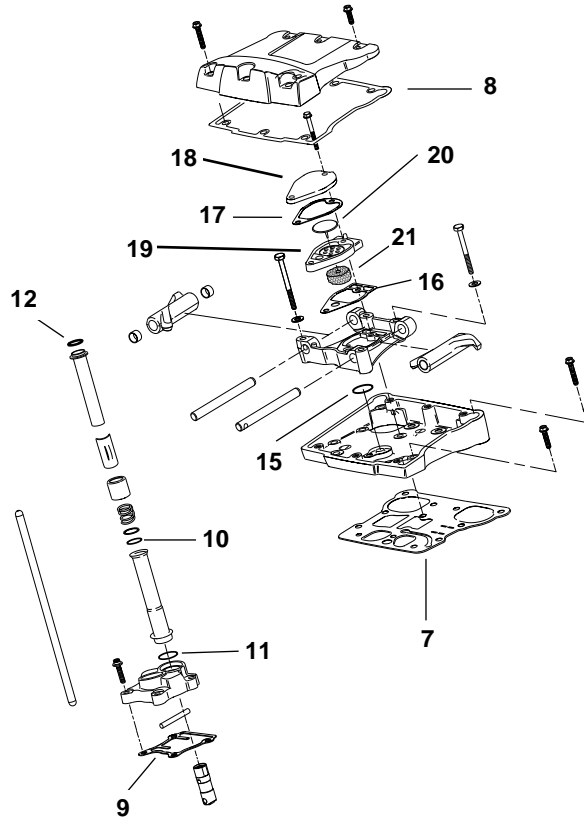
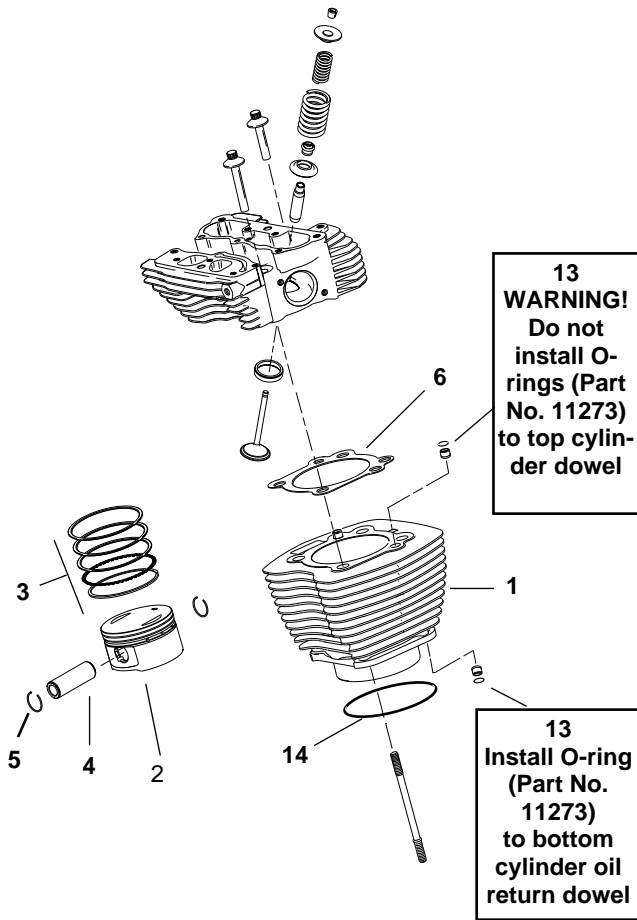
Part Number 29914-01

Date 7/02

Twin Cam 88 Big Bore/EFI Stage 2 Kit

i01333

i01332



Item	Description	Part No.
1	1550 Cylinder assembly (Black) (2)	16547-99
2	1550 Piston (2)	22114-99A
3	1550 Piston ring set (2)	21918-99
4	Piston pin (2)	22132-99
5	Piston pin circlip (4)	22097-99
6	1550 Head gasket (2)	16787-99
7	Gasket, rocker cover base (2)	16719-99
8	Gasket, rocker cover top (2)	17386-99
9	Gasket, tappet cover (2)	18635-99
10	O-ring, middle push rod cover (4)	11132
11	O-ring, lower push rod cover (4)	11145
12	O-ring, upper push rod cover (4)	11293
13	O-ring, cyl deck ring dowel (2)	11273
14	O-ring, cyl spigot (2)	11256
15	O-ring, rocker arm support (2)	11270
16	Gasket, breather baffle (2)	17643-02
17	Gasket, breather cover (2)	17643-02

Item	Description	Part No.
18	Cover, breather (2)	17647-02
19	Baffle, breather (2)	17648-02
20	Umbrella valve (2)	26858-99
21	Filter element, breather (2)	63815-99
22	Seal, exhaust (2) (Not shown)	65324-83A
23	Seal, intake manifold/EFI module (2) (Not shown)	26995-86B
24	Valve seal kit (1) (Not shown)	18004-86
25	Clutch, spring (Not shown)	37951-98
26	Flange, front (Not shown)	27009-86A
27	Flange, rear (Not shown)	27010-86A

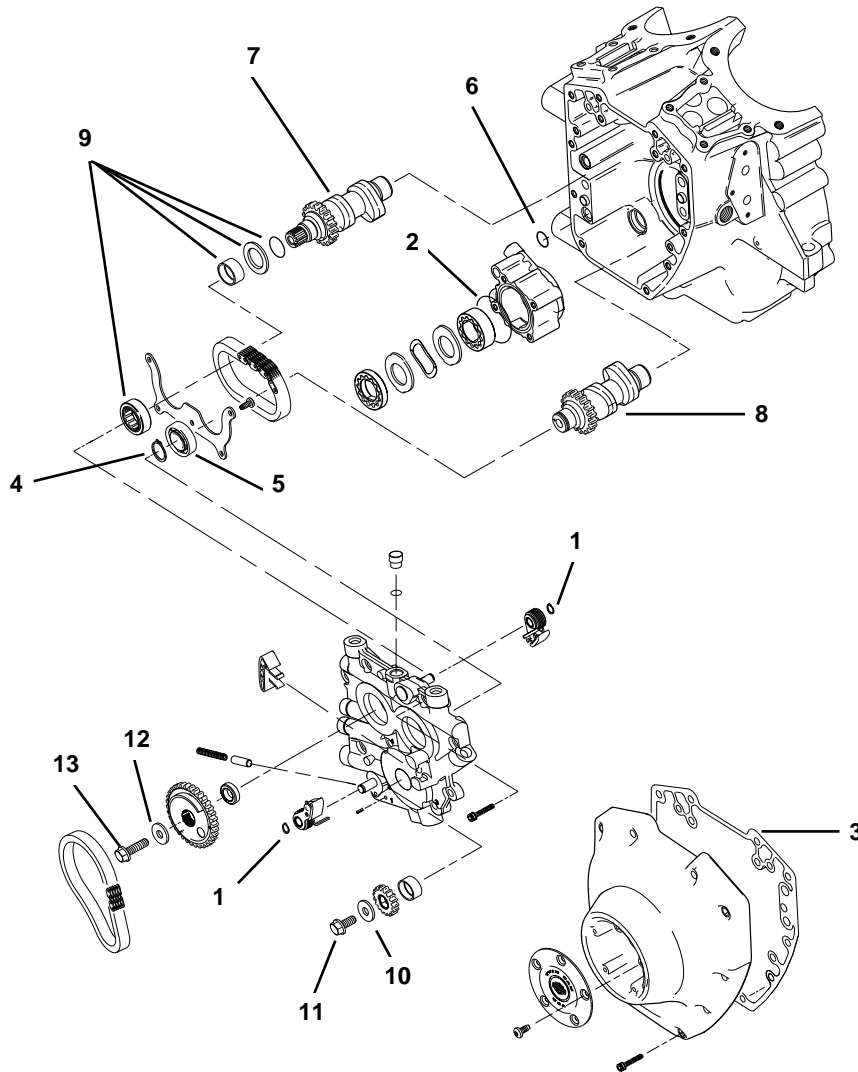


Service Parts

Part Number. 29914-01 | Date 7/02

Twin Cam 88 Big Bore/EFI Stage 2 Kit

io2070



Item	Description	Part No.	Item	Description	Part No.
1	Retaining ring (2)	11031	10	Washer (crank)	6278A**
2	O-ring, oil pump to cam plate (1)	11286	11	Capscrew, flanged (crank)	898A**
3	Gasket, cam cover (1)	25244-99	12	Washer (cam)	6294**
4	Retaining ring, camshaft (1)	11494	13	Capscrew, flanged (cam)	996**
5	Bearing, camshaft ball (1)	8990A	14	Loctite 262, high strength threadlocker (red) (not shown) (1)	94673-99
6	O-ring, cam plate to crankcase (1)	11301			
7*	Stage 2 camshaft, rear (1)	not sold			
8*	Stage 2 camshaft, front (1)	not sold			
9	Bearing kit, camshaft roller (1)	8983			

* Cam set available in kit P/N 25937-99A

**Parts only available together as Kit No. 25533-99A